**12U Biology- Metabolic Processes**

**Cellular Respiration – Multiple Choice**

Do not record your answers on this page. Record your answers on the test page.

1. Which of the following do not occur in the mitochondria?
   1. Kreb’s cycle
   2. Citric acid cycle
   3. Electron transport chain
   4. Glycolysis
   5. B and D
2. At the end of which stage is the original glucose completely broken down?
   1. Glycolysis
   2. Electron transport chain
   3. Kreb’s cycle
   4. Pyruvate oxidation
   5. Glucose never gets broken down entirely.
3. Which of the following is a product of lactic acid fermentation?
   1. Acetaldehyde
   2. NAD+
   3. Ethanol
   4. Carbon dioxide
   5. FADH
4. During glycolysis, which statements about ATP are correct?
   1. 2 ATP used, 2 ATP produced, for a net of 0
   2. 2 ATP used, 4 ATP produced, for a net of 2
   3. 4 ATP used, 2 ATP produced, for a net of 2
   4. 4 ATP used, 4 ATP produced, for a net of 0
   5. ATP are only created
5. Between which of the following compartments of the mitochondria is the proton gradient established?
   1. Matrix and cristae
   2. Matrix and intermembrane space
   3. Inner and outer mitochondrial membrane
   4. Cristae and outer mitochondrial membrane
   5. FADH
6. Which of the following occurs during glycolysis?
   1. The conversion of glucose to pyruvate
   2. A net gain of two **ADP**
   3. The synthesis of glucose from pyruvate
   4. Chemiosmotic synthesis of ATP
   5. A and B
7. Phosphofructokinase is an enzyme responsible for:
   1. Adding a phosphate
   2. Converting PEP to pyruvate
   3. Removing water
   4. Creating ATP from ADP
   5. A and D
8. What is the result of one molecule of glucose going through glycolysis?
   1. 2 Pyruvates
   2. G3P/DHAP
   3. 2ATP and 2ADP (net)
   4. 2 NADH
   5. A, C, and D
9. In the electron transport chain which of the following are required?
   1. ADP
   2. NADH
   3. Oxygen
   4. Water
   5. All of the above
   6. A,B,C
10. At the end of the Kreb’s cycle, most of the energy originally found in glucose is located in molecules of:
    1. CO2
    2. Citrate
    3. ATP
    4. NADH
    5. Acetyl CoA
    6. A and

**12U Biology**

**Metabolic Processes Test #2**

# Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Knowledge | Thinking | Application |
| /20 | /17 | /9 |

# Part A: Multiple Choice (10 marks- Knowledge)

**Record the correct answer below by circling the correct letter.**

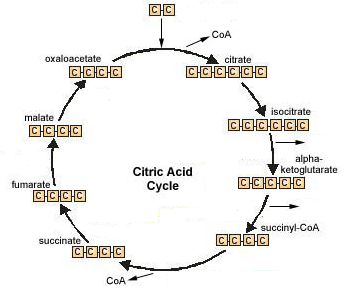
|  |  |
| --- | --- |
| 1. a b c d e | 6. a b c d e |
| 2. a b c d e | 7. a b c d e |
| 3. a b c d e | 8. a b c d e |
| 4. a b c d e | 9. a b c d e f |
| 5. a b c d e | 10. a b c d e f |

**/10K**

**Part B: Diagrams (8 marks- Knowledge, 5 marks – Thinking/Inquiry)**

1. Complete the diagram of the Kreb’s cycle below by:

* + - * 1. Filling in the waste product that is produced in the two boxes (1 mark).
        2. Completing the coupled reactions (arrows) (2 marks).
        3. Name the molecule that enters the cycle (1 mark).



**/4K**

## Draw out the reaction that takes place during pyruvate oxidation.

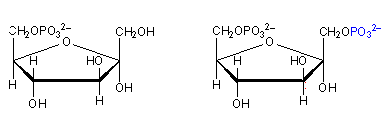
## a. Only the starting material and the final product need to be shown. Do not draw the intermediate compounds. (2 marks)

## b. Name the compounds (2 marks)

## c. Complete the coupled reaction (arrow). (1 mark)

## d. Fill out the boxes showing what is required and what is produced during the reaction. (1 mark)

**/4K**



* + 1. Name the compounds in the following reaction. Write your answers below the compounds. (2 marks)
    2. What is the enzyme (class) responsible for this reaction? (1 mark)
    3. Is energy being used or created in this reaction? (1 mark)

**/5T**

* + 1. What type of reaction is this? (1 mark)

**Part C: Short Answer (2 marks- Knowledge, 9 marks – Application, 12 marks – Thinking/Inquiry)**

* + - 1. a) What is oxidative phosphorylation? (1 mark)

b) What stage of cellular respiration does it occur in? (1 mark)

**/2K**

* + - 1. Fill out the following chart considering the breakdown of ONE GLUCOSE molecule. Include the amount (#) where applicable. **Note:** **The stages are not in order.** (6 marks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Stage |  |  | Kreb’s Cycle |  |
| Starting material |  | 10 NADH, 2 FADH2 |  |  |
| Waste Products Produced | 2 CO2 |  |  |  |
| Net ATP Produced |  |  |  | 2 ATP |

**/6T**

3. a) An athlete that is considered to be fit is able to maximize the amount of oxygen entering his or her bloodstream and supply enough energy to keep the muscles moving. What form is this energy available in, and during which stage(s) is it created? (2 marks)

b) Explain what happens to the pyruvate molecules in this case and what happens to the compound that is formed? (2 marks)

**/4A**

* + - 1. Mature red blood cells do not have any mitochondria, yet they live for weeks. Predict which respiratory process might occur in red blood cells and explain your prediction. What metabolic products would you expect to find in red blood cells that would support your prediction? (2 marks)

**/2T**

* + - 1. a) What happens when an electron passes through the different complexes in the ETC? (1 mark)

b) How many ATP are produced by each of the electron carriers in the electron transport chain? (1 mark)

NADH –

FADH2 --

c) What is the reason behind this large discrepancy? (2 marks)

**/4T**

* + - 1. If you are deficient in iron your red blood cells cannot pick up and transport oxygen efficiently. Explain why being iron deficient can cause someone to be fatigued (tired). (2 marks)

**/2A**

* + - 1. a) Silver leaf white flies thrive in desert regions. The air temperature can reach up to 50oC. Enzymes start to denature above 42oC so they need specific mechanisms in place to cool. In particular isomerase enzymes are affected by this sudden change in temperature. What stage(s) of cellular respiration might be affected if these enzymes are not functioning?

b) What stage(s) would be affected if the isomerase enzymes become denatured only in the cytoplasm? Name one reaction that needs an isomerase enzyme to occur and is found in the cytoplasm.

**/3A**